Paper No. 22

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte BRUCE I. BERKOFF
and
HUGO JOHN CORNELISSEN

Appeal No. 2004-1069
Application No. 09/569,616

ON BRIEF

Before COHEN, NASE, and BAHR, Administrative Patent Judges.

NASE, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1 to 5, which are all of the claims pending in this application.

We REVERSE.

BACKGROUND

The appellants' invention relates to an input and a display device provided with an output screen and means for determining a position of a pointing device relative to a position at the output screen wherein the means for determining comprises elongated radiation sources along two substantially non-parallel sides of the output screen for radiating radiation in beams to opposing sides of the output screen, which beams are substantially parallel to a surface of the output screen (specification, p. 1). A copy of the claims under appeal is set forth in the appendix to the appellants' brief.

The prior art reference of record relied upon by the examiner in rejecting the appealed claims is:

Tai et al. (Tai)	5,506,929	April 9, 1996

Claims 1 to 3 and 5 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Tai.

Claim 4 stand rejected under 35 U.S.C. § 103 as being unpatentable over Tai.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellants regarding the above-noted rejections, we make reference to the answer

(Paper No. 17, mailed March 20, 2003) for the examiner's complete reasoning in support of the rejections, and to the brief (Paper No. 16, filed February 5, 2003) and reply brief (Paper No. 18, filed May 27, 2003) for the appellants' arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellants' specification and claims, to the patent to Tai, and to the respective positions articulated by the appellants and the examiner. As a consequence of our review, we make the determinations which follow.

The anticipation rejection

We will not sustain the rejection of claims 1 to 3 and 5 under 35 U.S.C. § 102(b).

Anticipation is established only when a single prior art reference discloses, expressly or under the principles of inherency, each and every element of a claimed invention. RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984). In other words, there must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. Scripps Clinic & Research Found. v. Genentech Inc.,

927 F.2d 1565, 1576, 18 USPQ2d 1001, 1010 (Fed. Cir. 1991). When the claimed invention is not identically disclosed in a reference, and instead requires picking and choosing among a number of different options disclosed by the reference, then the reference does not anticipate. Thus, the invention must have been known to the art in the detail of the claim; that is, all of the elements and limitations of the claim must be shown in a single prior reference, arranged as in the claim. See Karsten Mfg. Corp. v. Cleveland Gulf Co., 242 F.3d 1376, 1383, 58 USPQ2d 1286, 1291 (Fed. Cir. 2001); Akzo N.V. v. International Trade Commission, 808 F.2d 1471, 1480, 1 USPQ2d 1241, 1245-46 (Fed. Cir. 1986), cert. denied, 107 S.Ct. 2490 (1987); In re Arkley, 455 F.2d 586, 587-88, 172 USPQ 524, 526 (CCPA 1972).

Claim 1, the only independent claim on appeal, reads as follows:

> Input and display device provided with an output screen and means for determining a position of a pointing device relative to a position at the output screen, said means for determining comprising elongated radiation sources along two substantially nonparallel sides of the output screen for radiating radiation in beams to opposing sides of the output screen, which beams are substantially parallel to a surface of the output screen characterized in that a lighting system for the output screen is provided, which lighting system comprises a substantially flat light guide and in that the elongated radiation sources comprise means stretching along two substantially non-parallel end sides of the flat light guide for coupling radiation into the flat light guide, which means for coupling radiation into the flat light guide have radiation output windows with tangential dimensions (E) larger than a thickness dimension (D) of the flat light guide, which tangential dimensions (E) are in a direction substantially orthogonal to a surface of the flat light guide, which surface of the flat light guide is substantially parallel to the surface of the output screen, and which means for coupling radiation into the flat light guide protrude above an

upper one of said surfaces and have portions of the radiation output windows protruding above the upper one of said surfaces.

Tai's invention relates generally to lighting systems and, in particular, to a system for converting light output from a point-like light source into a linear or planar light beam that can be collimated in one or more dimensions to a predetermined degree. Figure 1 is a simplified perspective view of a light expanding system according to one embodiment of Tai's invention. Figure 4 is a simplified perspective view of a light expanding system according to another embodiment of Tai's invention. Figure 5A is a perspective view of a prismatic diffuser for use with a light expanding system according to Tai's invention. Figure 6 is a simplified perspective view of a light expanding system according to another embodiment of Tai's invention. Figure 7 is a simplified perspective view of a light expanding system according to yet another embodiment of Tai's invention. Figure 8A is a simplified perspective view of the light expanding system of Figure 7 used with two point-like light sources. Figure 8D is a simplified perspective view of a light expanding system according to another embodiment of Tai's invention using two point-like light sources.

The light expanding system 10 shown in Figure 1 includes a beam collector 28 and a beam expanding light pipe 14 to convert divergent light from a point-like light source 2 into a linear light beam. Divergent light is emitted by the light source 2. The

beam collector 28 directs the divergent light from the light source 2 through an entry surface 16 of the beam expanding light pipe 14. A plurality of microprisms 44 are positioned adjacent to a reflecting surface 20 of the beam expanding light pipe 14. The reflecting surface 20 is, in this embodiment, substantially perpendicular to the entry surface 16 of the beam expanding light pipe 14. Light that enters the beam expanding light pipe 14 is directed by the microprisms 44 so that the light exits the beam expanding light pipe 14 at an emission surface 22 that is opposite the reflecting surface 20. Additionally, for certain applications, it is also desirable to have output light propagate from the emission surface 22 of the beam expanding light pipe 14 in a direction that is not normal to the emission surface 22. A prismatic diffuser can be used with the light expanding system 10 to direct the output beam to propagate in a desired direction and/or increase the divergence angle to a desired value.

The light expanding system 10' shown in Figure 4 includes a beam collector 28' and a beam expanding light pipe 14' that each have a generally circular cross-section. The circular cross-sectional sectional shape of the beam expanding light pipe 14' is truncated at two locations to form opposing flat surfaces 20 (reflecting surface) and 22 (emission surface) that extend along the entire length of the beam expanding light pipe 14'. The beam expanding light pipe 14' also has an entry surface 16' and an end surface 18' that each have a truncated circular cross-sectional shape. In this

embodiment, to form flat surfaces that correspond to the flat surfaces of the beam expanding light pipe 14', the cross-sectional shape of the beam collector 28' is also truncated at an end that is adjacent to the entry surface 16' of the beam expanding light pipe 14'. The truncated portion of the beam collector 28' does not extend along the entire length of the beam collector 28'.

Figure 5A is a perspective view of a prismatic diffuser 66, for use with a light expanding system according to the invention, that can be used to change the propagation direction and divergence angle of a light beam that is output from the light expanding system. The prismatic diffuser 66 is made of a transparent material such as acrylic or polycarbonate. The prismatic diffuser 66 is formed as a very thin material. For example, typically, the prismatic diffuser 66 has a thickness that is on the order of 10 or more times thinner than the thickness of the beam expanding light pipes, e.g., beam expanding light 14. Also, the prismatic diffuser 66 has a thickness having the same order of magnitude as the pitch of the microprisms formed as part of the prismatic diffuser 66, while the beam expanding light pipe 14 has a thickness that is on the order of 10 to 100 times larger than the pitch of the microprisms 44. The prismatic diffuser 66 has a light input surface 100 and a light output surface 101 opposite the light input surface 100. The light input surface 100 is flat, while the light output surface 101 is shaped to form a prismatic structure. The prismatic diffuser 66 is positioned adjacent

the surface from which light is emitted from the light expanding system, e.g., adjacent the emission surface 22 of the beam expanding light pipe 14, so that light passes through the prismatic diffuser 66 and is refracted.

The light expanding system 100 shown in Figure 6 includes the beam collector 28, the beam expanding light pipe 14 (first beam expanding light pipe) and a second beam expanding light pipe 70 to convert divergent light from the light source 2 into a planar light beam. The beam collector 28 and the first beam expanding light pipe 14 operate as described above. The light that exits the first beam expanding light pipe 14 from the emission surface 22 enters the second beam expanding light pipe 70 through an entry surface 74 of the second beam expanding light pipe 70. Tai teaches (column 12, lines 56-61) that

> the dimensions of the entry surface 74 are chosen to be at least as large as the corresponding dimensions of the emission surface 22 of the first beam expanding light pipe 14. This is done to avoid light leakage as light passes between the first beam expanding light pipe 14 and the second beam expanding light pipe 70.

A plurality of microprisms 72 are positioned adjacent to a reflecting surface 76. The reflecting surface 76 is substantially perpendicular to the entry surface 74 of the second beam expanding light pipe 70. The microprisms 72 direct the light so that the light exits the second beam expanding light pipe 70 at an emission surface 78 that is opposite the reflecting surface 76. An end surface 79 of the second beam expanding light pipe 70,

opposite the entry surface 74, can be coated with a light reflecting material to reflect light back towards the entry surface 74. The length of the first beam expanding light pipe 14 (i.e., the distance between the entry surface 16 and the end surface 18, as shown in Figure 1) and the second beam expanding light pipe 70 (i.e., the distance between the entry surface 74 and the end surface 79) are each determined so that the planar beam exiting the second beam expanding light pipe 70 has desired dimensions.

The light expanding system 200 shown in Figure 7 includes a beam collector 28' and beam expanding light pipe 14' (first beam expanding light pipe), as described above with respect to Figure 4, and a second beam expanding light pipe 70'. The second beam expanding light pipe 70' is similar to the second beam expanding light pipe 70 described above with respect to Figure 6, differing only in the orientation with respect to the first beam expanding light pipe 14' (first beam expanding light pipe 14 in Figure 6). Light exiting the second beam expanding light pipe 70' is directed up in the plane of Figure 7, while light exiting the second beam expanding light pipe 70 is directed down in the plane of Figure 6. In the light expanding system 200, a thin layer of laminating adhesive 71 is used to attach the emission surface 22' of the first beam expanding light pipe 14' to the entry surface 74' of the first beam expanding light pipe 70'. The prismatic diffuser shown in Figure 5A can also be placed on top of the beam

expanding light pipe 70' to change the output light propagation direction and increase the divergence angle of the output light beam to a predetermined value.

The light expanding system 200' shown in Figure 8A uses two point-like light sources. In addition to the beam collector 28', first beam expanding light pipe 14' and second beam expanding light pipe 70', the light expanding system 200' includes a second beam collector 29 that is similar to the beam collector 28'. The second beam collector 29 is located adjacent to the end surface 18' (Figure 4) of the first beam expanding light pipe 14'.

Figure 8D depicts a light expanding system 150. The assembly 150 includes a beam expanding light pipe 115, similar to the beam expanding light pipe 70 of Figure 6. The assembly 150 also includes beam expanding light pipes 111 and 112 positioned adjacent to different ones of the four surfaces of the beam expanding light pipe 115 that are perpendicular to the surface from which light is emitted from the beam expanding light pipe 115. The beam expanding light pipes 111 and 112 can be positioned adjacent to any two of the four surfaces: one possible configuration is shown in Figure 8D. A first point-like light source 101 emits light that passes into a beam collector 125 which then passes the light into light expanding light pipe 111. The light is redirected out of the light expanding light pipe 111 into the light pipe 115. A second

point-like light source 102 emits light that passes into a beam collector 126. The beam collector 126 passes the light into light pipe 112. The light is redirected out of the light pipe 112 into the light pipe 115. The light is then redirected out of the beam expanding light pipe 115.

We agree with the appellants that claim 1 is not anticipated by Tai. In that regard, there is no single embodiment disclosed by Tai that meets all the limitations of claim 1. The closest embodiment disclosed by Tai to the subject matter recited in claim 1 is Figure 8 which includes elongated radiation sources (i.e., light pipes 111 and 112) along two substantially nonparallel sides of a substantially flat light guide (i.e., light pipe 115). However, Tai's flat light guide (i.e., light pipe 115) has a thickness dimension which is equal to the corresponding dimension of the emission surfaces 22 of the beam expanding light pipes 111 and 112. This is done to avoid light leakage as light passes between the beam expanding light pipes 111 and 112 and the beam expanding light pipe 115. Accordingly, the limitation of claim 1 that "which means for coupling radiation into the flat light guide have radiation output windows with tangential dimensions (E) larger than a thickness dimension (D) of the flat light guide, which tangential dimensions (E) are in a direction substantially orthogonal to a surface of the flat light guide" is not met by Tai.

The examiner's position that the above-noted dimensional relationship is met by Tai's prismatic diffuser 66 is without merit since the prismatic diffuser 66, while a flat light guide, is not arranged as set forth in claim 1.

For the reasons set forth above, the decision of the examiner to reject claim 1, and claims 2, 3 and 5 dependent thereon, under 35 U.S.C. § 102(b) is reversed

The obviousness rejection

We will not sustain the rejection of dependent claim 4 under 35 U.S.C. § 103 since the examiner has not established that the limitations of claim 1 not taught by Tai, as set forth above with respect to claim 1, would have been obvious at the time the invention was made to a person of ordinary skill in the art.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1 to 3 and 5 under 35 U.S.C. § 102(b) is reversed and the decision of the examiner to reject claim 4 under 35 U.S.C. § 103 is reversed.

REVERSED

IRWIN CHARLES COHEN Administrative Patent Judge	)
JEFFREY V. NASE Administrative Patent Judge	) BOARD OF PATENT) APPEALS) AND) INTERFERENCES
JENNIFER D. BAHR Administrative Patent Judge	)

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